

Types of thoracolumbar injuries:

- 1-Thoracic region: Spinal cord injury. (UMNL)
- 2-Thoracolumbar junction (Site of the conus): Mixed cord and root injury.
- 3-Lumbar region below L1: Roots and cauda equina injury.

Mechanism of Spinal Injuries: (according to patient movement during injury)

1-Hyper flexion:

- Stable •Affects Cervical, dorsal and lumbar spine
- Wedge # Superior Anterior of vertebra •Spinal cord injury unlikely
- **If wedge # affect > 50 % of vertebral height, the posterior column will surely be affected

2-Hyperextension:

- Stable •Affects mainly cervical spine •May cause cord compression
- Ant. longitudinal ligament damage (Whiplash's injury) + possibly rupture of intervertebral disc

3-Shearing:

- Unstable •Usually with rotation •Spinal cord injury is **common**
- Leads to Dislocation or # Dislocation

Spine stability: "Denis three column concept"

-The spinal motion segment into three columns:

Anterior column: •Anterior longitudinal ligament •Anterior half of body and intervertebral disc

Middle column: •Posterior half of body and intervertebral disc •Posterior longitudinal ligament

Posterior column: •Transverse process •Spinous process •Pedicle •Lamina •Faceted joints
•Interspinous ligament •Supraspinous ligament •Ligamentum flavum

*If ant. column is affected → 50% of stability is lost while if middle → 30% and if posterior → 20%

So, spinal stability is dependent on at least two intact columns.

Types of Spine fractures: (according to Denis concept)

Type of fracture	Stability	Mechanism of injury
Compression fracture	Stable	Flexion (Anterior / Lateral)
Burst fracture	Stable	Axial Load
Seat belt fracture	Unstable	Flexion distraction
Fracture-dislocation	Unstable	Flexion rotation – Shear – Flexion distraction

****Chance Fracture:** is a subtype of seat belt # (flexion distraction) which involves compression of the anterior column and distraction of the middle and posterior columns, it may be pure ligamentous

Spinal Shock:

- Follows injury to the Spinal Cord -Characterized by Flaccid paralysis
- Loss of Sensation, Power, Reflexes below the level of cord injury
- Loss of the Bladder function: Urinary Retention
- Lasts up to 24 hours -Recovery may begin immediately

N.B.:

A) Bulbocavernosus reflex:

(to differentiate paralysis due to spinal shock from paralysis from paraplegia)

- Stimulus:** Squeezing the glans penis (clitoris in females) or tugging on the Foley
- Mediated by:** S2-S4 •**Response:** Anal sphincter contraction
- Value:** presence of the reflex in paraplegic patient means end of spinal shock

B) To differentiate incomplete spinal cord injury from complete paraplegia:

1-Sacral sparing: preservation of cutaneous sensation in the sacral dermatomes, even though sensation is impaired in the thoracic and lumbar dermatomes below the level of the lesion

2-Plantar flexion of the big toe preserved

Evaluation:

A) Patient evaluation:

i) General assessment: **ABC**

ii) Spine evaluation: "**Frankel scale**"

A- No motor or sensory function below the level of injury.

B- Sensation but no motor function.

C- Useless motor function.

D- Useful motor function.

E. Normal motor and sensory

B) Radiological evaluation:

1-Plain radiography 2-Myelography: Obsolete 3-CT: shows the degree of stability

4-MRI: shows the soft tissues and the neurological component

Management of spinal injuries:

A) First aid treatment: (At the scene of the accident)

-Correct method of patient Resuscitation at site of accident

-Correct method of patient **Transfer** to hospital

النقل الصحيح للمريض بيمين حدوث إصابة أو زيادة الإصابة للـ Spinal cord ، يخطئ كثير من الناس في محاولة جعل المصاب يقف على قدميه ، النقل السليم باستخدام Patient Sliding board أو لوح خشب أو حتى ضلقة باب!!

B) Careful Neurological and Radiological Assessment: in hospital to determine extent and site of injury

C) Management of Spinal Shock & Paralysis

● Management of Cord Compression (If paralysis was due to cord compression NOT transection)

-Removal of cord compression is usually done through Anterior Approaches

-Whole of fractured vertebra is excised and replaced by bone graft

-Attention is given to remove bony fragments from inside spinal canal

●Medical management of Paralysis

1-Immediate catheterisation to prevent overflow incontinence of bladder which follows the urinary retention

2-Prevention of pressure (bed sores) by regular turning of patient every <6 hours

3-Prevention of DVT by all known measures

4-Prevention of joints stiffness and deformities by physio and functional joint postures

5-Prevention of Pulmonary complication

6-Maintenance of fluid, electrolytes and protein balance

7-Immediate attention to any possible infection

8-Be aware of incidence of Heterotopic Calcification which may follow head or spinal injuries

D) Definitive treatment:

●Stable fractures without neurological deficit.: Conservative (Bracing)

●Unstable fractures and/ or neurological deficits:

Surgical decompression and stabilization using "**Transpedicular Screws & Plates**"

Complications:

1-Urinary complication 2-Chest infection 3-DVT 4-Bed sores.

5-Pulmonary embolism 6-Spasticity and contractures 7-Heterotrophic ossification